August 14, 1962

MEMORANDUM FOR THE RECORD

SUBJECT: Analysis of Equipment Plans

1. The original proposal of IBM was a sound recommendation. It proposed an IBM 1401 system of sufficient capacity (8000 core storage, four Type 7330 Tape Drives, and a Type 1404 Printer/Bill Feed) to be considered as a full scale, self contained data processing system. The tape drives were sufficient to permit high speed sorting; an important and fundamental function in any data processing application. The IBM Type 1922 Foreign Tape Drive Adapter provided a means of reading IBM cards and converting them to edited magnetic tape records for input to the RCA 501 Computer. The Type 1922 also provided a means of reading the RCA 501 tapes and printing or card punching the output data from the RCA 501 Computer. The Type 1404 Printer/Bill Feed offered an opportunity to reduce significantly our IBM 407/408 punched card accounting machines, even were we to hold ~~on~~ one 407 for utility use. The reliability of the IBM 1401 hardware, availability of tested software, technical support of IBM representatives, savings in EAM equipment and operators, and overall economics of the proposal lead one to believe that this would have been an excellent plan for us. Apparently this belief was shared by others since it was strongly endorsed and recommended.

2. Instead of the original IBM proposal, we have ordered a more or less minimum IBM 1401 system configuration which is sufficient to overcome the mechanical difficulties which are being experienced with the RCA 501 input/output equipment. A number of card processing operations can be performed on this equipment, but the absence of the four Type 7330 Tape Drives eliminates the possibility of high speed sorting operations or the possibility of storing data files on magnetic tape for future updating or processing operations within the IBM 1401 system. Normally, only one of the eight RCA Type 581 Tape Drives will be available for feeding the RCA 501 output into the line printing or card punching equipment of the IBM 1401 system or for receiving input data for the RCA 501 from the IBM 1401 card reading equipment. The IBM Type 1404 Printer/Bill Feed has not been ordered with the current IBM 1401 System, but in view of the strong justification previously made for this equipment one must question this decision.

3. Where do we stand today? First of all, it is only five months since we ordered the IBM 1401 System. We did this after RCA's proposal for an RCA 301 System and DMJM's endorsement of the RCA 301 System as a reliable, cost comparable system.....We have trained a number of people to program the 1401. We have received necessary technical support from IBM for the preparation of required input/output routines.

The reliability of card reading, card punching, and line printing operation with the 1401 system is still unchallenged. In fact, RCA has recently announced the availability of IBM 1401 input/output equipment with the RCA 301 Data Processing System. There is reason to believe that RCA has cured their printer problems with the switch to the Anelex printer. Some doubt still exists regarding the reliability of RCA card reading equipment. We have had what may be considered normal programming frustrations in learning to program a new system for a rather unusual application. This situation should improve rapidly with experience and installation of the 1401. We have already completed the one time alteration requirements and incurred these costs. The 1401 system is now in Washington awaiting installation approximately 30 days hence. IBM has raised the rental on the Type 1922 Foreign Tape Adapter from $925 to $1810, but this will not be effective until 1 July 1963. We have witnessed user demonstrations of the IBM 1401 and RCA 301 systems. We are currently re-evaluating our equipment plans.

4. We have done our best to make the right decisions in the choice of equipment. We are pretty far "down the road" to make an abrupt change in course at this time unless extremely serious obstacles are apparent. Until the recent notification by IBM of a price increase in 1963, our plans were to install the IBM 1401 system on September 15th. Why should we not proceed as planned?

STATINTL [redacted]

Next 1 Page(s) In Document Exempt

13 August 1962

MEMORANDUM FOR THE RECORD

SUBJECT: RCA 501/IBM 1401 System for the Comptroller

Since I learned of ADPD's plans to re-evaluate the use of the IBM 1401 as an input/output system for the RCA 501 Computer, I have reviewed the records which set forth the reasons and justifications leading up to the decision to install 1401 equipment. The written record may be summarized as follows:

Tab A - Letter from IBM to ADPD dtd Sept. 29, 1961.

This letter presented the IBM proposal for a complete IBM 1401 data processing system. The system was to have 8,000 positions of core storage, four 7330 tape units, a 1404 printer, and a Foreign Tape Adapter to make communications with the 501 possible. The total rental was $8,460. The proposal also recommended elimination of considerable EAM equipment to the point where only key punches and verifiers, one interpreter, sorter, collator and reproducer would remain.

Tab B - Memo from ADPD to the Comptroller dtd Dec. 20, 1961.

This memo recommends acceptance of the IBM proposal. Among the reasons given for this recommendation were:

1. Existing I/O equipment for the 501 was unsatisfactory from a mechanical standpoint.
2. Approximately $5,700 per year could be saved in paper costs thru the use of the 1404 printer.
3. There was no clear proof that the RCA 301 (a system comparable to the 1401) would correct the mechanical difficulty being experienced with the RCA 501 I/O equipment.
4. The 1401 with four 7330 tape stations and 1404 printer would enable EAM work to be processed and eliminate two 408 accounting machine ($1200 each). There was proof that the 1401 system would eliminate mechanical difficulties inherent in the present RCA 501 I/O equipment.

5. The 132 printing positions available with the 1404 were advantageous for several applications.

6. The 1404 printer would reduce time in preparing checks, Time and Attendance cards, and enable the preparation of employee's statement of earnings and deductions on card forms rather than continuous paper forms.

7. Compatability of the 1404 printer with equipment at the Treasury Dept., Disbursing Office and Commerce Dept. 1404.

The only disadvantage shown was the requirement for one programmer for a period of 60 - 90 days to work with the manufacturer in completing format programs for input/output routines on the 1401 system.

Tab C - Letter from IBM to ADPD dtd March 13, 1962.

This letter listed a minimum input/output 1401 configuration totaling $4495 per month rental. (It should be pointed out that this limited configuration would make it impossible to gain many of the advantages which were listed in the IBM proposal and endorsed by ADPD.)

Tab D - Letter from IBM to ADPS dtd March 21, 1962.

This letter set forth IBM's plan for developing the necessary programs and meeting installation requirements. It recommended that six programmers currently assigned to RCA 501 input/output programs be trained for 1401 programming.

Tab E - Memo For The Record from ADPD dtd 26 March 1962.

This memo reported discussions with RCA personnel advising them of our reasons for selecting the 1401 equipment. These reasons may be summarized as follows:

1. Advantage of the 1404 printer to payroll operations.
2. Established reliability of 1401 card reader and card punch equipment.
3. Special paper savings of $6,000 per year.
4. Compatability of equipment with other government agencies.
5. 1401 Back up equipment in other areas of CIA.

Tab F - Letter of Intent to IBM from Procurement Division, OL dtd March 29, 1962.

This letter ordered the limited 1401 system. No 1404 equipment was included.

Tab G - Letter from IBM to ADPS dtd July 26, 1962.

This letter advised the Agency of the increased rental of the type 1922 Foreign Tape Adapter from $925 to $1810 per month, effective 1 July 1963.

STATINTL [redacted]

CONFIDENTIAL

21 August 1962

MEMORANDUM FOR THE RECORD

SUBJECT: System Requirements for RCA Type 301

25X1A

Mr. Jack Walsh, RCA Representative; Mr. Howard Moss, RCA Technical Representative; and Messrs. [redacted] met on 20 August to review CIA system requirements. The following discussions took place:

1. Simultaneous Mode Control #392
This is a device to permit overlap of input/output operations, or compute with overlap of one of these operations. The operations people did not feel that this device was required.

2. 581 Adapter, #393-2
This is an additional adapter which would make it possible to use two of the type 581 Tape Drives at the same time in the 301 system. It was not felt that this was a requirement.

3. Card Processing Capabilities
The capability of the 301 to handle certain EAM operations was discussed and it appeared that the Locator File and Insurance Payments Job could be absorbed by the 301. The Unvouchered Payroll is currently being developed for the 501 as well as the Employee Qualifications file. The result of these plans may be to reduce the EAM to one basic set of machines with a type 408 Bill Feed as a printing device.

4. Present Printing, Card Reading and Card Punching Workloads
The machine usage reports disclose the following:

1961	Printing	Card Reading	Card Punching	Total
Aug	51	21	24	96
Sept	78	5	19	102
Oct	131	15	45	191
Nov	100	12	31	143
Dec	131	9	20	160
Jan 62	133	10	25	168
Feb	91	23	20	134
Mar	92	13	20	125
Apr	106	16	26	148
May	149	15	31	195
June	116	16	22	154
July	135	21	33	189
	1313	176	316	1805

CONFIDENTIAL

It was concluded that the minimum 301 configuration ($3993 for 200 hours) could handle the expected workloads. This included an allowance for peripheral operations involved in the applications mentioned in item 3, above. The largest volume of peripheral operation is in printing, and the proposed type 333 is rated at 1000 lines per minute compared with 600 lines per minute on present equipment.

5. 323 Card Reader/334 Card Punch Vs 1402 Card Reader Punch

The cost comparison is approximately as follows:

323 Card Reader	$361
334 Card Punch	206
314-1 Card Reader Cont.	134
315-1 Card Punch Cont.	283
Total	$984

1402 Card Reader/Punch	$560 (3 pt Clutch)
369-1 Card Reader Punch Control	597
	$1157

The difference is $173 (a slight technicality needs to be resolved because of IBM's 176 hour contract on the 1402 and RCA's 200 hour contract on the Card Reader Punch Control).

The speeds:

RCA		1402	
Read	600/min.	Read	800/min.
Punch	100/min.	Punch	250/min.

The reliability:

RCA assures us that the mechanical difficulties with previous peripheral equipment have been corrected--They do not seem to want to promote the use of the 1402 at this time because the speeds of the RCA gear will meet our requirements, there are some delivery time and test problems with the 1402, it is competitive equipment. We would be pioneering if we asked for a 1402 since there are only two in current operation, both in a more-or-less laboratory situation within RCA.

6. System Requirements

These requirements have been defined as replacement of presently

unsatisfactory peripheral equipment and some slight switching of EAM to EDP. RCA representatives felt that they had necessary information to present their recommendations.

25X1A [redacted]
Chief,
Support Division, ADPS

cc: ADPD

IBM
Federal Systems Division
1111 Connecticut Avenue, N.W.
Washington 6, D. C.

International Business Machines Corporation

FEderal 3-6700

August 14, 1962

STATINTL [redacted]
2430 E Street, N. W.
Washington 25, D. C.

STATINTL [redacted]

Much progress has been made in the installation planning for the IBM 1401 that is designed to provide the input/output function to the RCA 501. At this time, we would like to give you a report as to the exact status of the progress.

The 1401 is scheduled for installation on Saturday, September 15, 1962.
STATINTL This date was selected b[redacted]as the most suitable time, in view of monthly closing schedules. The plan is to have a rigger remove the RCA input/output equipment first and then install the 1401. The rigger has been notified and has scheduled September 15 for the installation date. Checkout of the 1401 by the IBM Customer Engineers will begin immediately after the equipment is moved into place. The 1401 should be ready to be turned over to the Agency two and one half days after the Customer Engineers start their checkout.

In covering the progress of installation planning, we will follow the items mentioned in our recommended schedule for installing the IBM 1401, dated March 21, 1962.

The initial problem definitions were basically designed during the 1401 programming course. The general logic was worked out for the required 1401 programs, and the programming techniques designed for the general logic have been used extensively in the programs that have been written. Our recommendation of simulating the control panels now being used for card-to-tape, tape-to-card and tape-to-printer is being followed rather than writing a 1401 program for every 501 program. This approach requires the least amount of programming.

The delivery of the RCA 581 tape station was made to the IBM manufacturing facility in Endicott, New York in sufficient time to completely test out the system prior to shipment.

Physical installation planning has been conducted. A recommended machine
STATINTL room layout was designed and reviewed [redacted] Measurements were made to assure that there would be no problem with rigging the equipment into the machine room. A meeting was held to determine that the RCA tape switching unit could be utilized with the 1401 installation. Power and air conditioning were determined to be more than adequate for the 1401 installation.

An on-site 1401 programming course was conducted by IBM and was "tailor-made" to fit your requirements. As mentioned previously, the general logic for simulating the existing control panels was designed during this course.

The programming staff assigned to the 1401 effort has completed approximately 80 per cent of the program requirements for your 1401 system. There were originally sixty 1401 programs required to simulate the existing control panels for all input/output operations to the RCA 501. As of now, the original estimate of programs has increased to seventy. Presently, sixty-five of these programs have been written, and four of the remaining five are in the process of being written and should be completed by August 17. The fifth program is waiting completion of a 501 program which produces the input to the 1401.

Of the sixty-five programs that have been written, forty-four have been completely tested and are ready for production processing. Of the remaining twenty-one which have been written, eleven should require no more than two additional test sessions before their completion. Normally, two test sessions are made per week. Five will require more testing, but should be completely tested by August 24 or August 31 at the latest. The remaining five programs have not been tested, but four should be operational by August 31 and the fifth program should be completed by the first week in September. Two of the remaining five programs to be written should be completely operational by August 31 and two more will be completed by the first week in September. The final program, as mentioned previously, is awaiting a 501 program. However, all programs will be completed in advance of the 1401 installation.

There are no programs which exceed core storage. The 4,000 positions of core storage is more than adequate for these programs, as well as programs for some of the current punched card operations using the Report Program Generator.

The majority of program testing has been conducted on the 1401 currently installed in the Agency. Also, some of the testing has been done on the 1401 at the IBM Washington Test Center, as well as at Social Security in Baltimore.

Testing of the 1401 programs which have been written has been done with test data converted at Social Security in Baltimore. Actual data has been transferred from RCA tapes to IBM tapes via the 1922 Foreign Tape Adapter at Social Security, and

the IBM tapes have been used to test the programs on local 1401 systems.

There have been several occasions when a 1401 program which has been fully tested against IBM tapes has been run at Social Security against RCA tapes to see if the results were the same when using the 1922 tape adapter. On all occasions, the results were successful.

The testing of all card-to-tape programs has been done at Social Security. RCA tapes have been generated there by use of the 1922, and these tapes have been returned to Washington for editing on the 501. Again, the results have been successful.

Accessories and supplies required for your 1401 system, such as 1403 printer ribbons and tapes for the tape controlled carriage are available locally. Therefore, immediate delivery is available for these items.

In summary, all aspects of installation planning for your 1401 system are nearing completion. The physical installation planning is complete, in that the room is ready with its false floor, power and air conditioning. The programs are rapidly being completed and will be ready for production processing prior to the 1401 being installed.

IBM has had extensive experience installing and maintaining 1401 Data Processing Systems, including two in the Agency. This experience assures you the high quality of service available from IBM.

If you have any questions, please advise. Thank you for your consideration.

Very truly yours,

R. D. Pease

R. D. Pease

RDP/pf

14 aug 62

I Problem: Replacement of RCA 501 Peripheral Equipment

II Facts:

1. The referenced memorandum details the problems encountered with RCA 501 peripheral equipment, compares two proposed systems (IBM 1401 and RCA 301) to replace the peripheral equipment, and recommends a letter of intent be placed with IBM to install a 1401 system in January, 1963. A letter of intent was written 29 March 1962.

2. Since the referenced memorandum was prepared, computer manufacturers have changed prices, computer equipment, and software, and the requirements of this division have changed. Therefore, the conclusions and recommendations made in the referenced memorandum must be reconsidered. IBM has raised the price of the equipment on order by $885.00 per month, effective 1 July 1963. Also, we have ordered necessary special devices at an additional cost of $90.00 per month, a total of $975.00 per month over the price of the equipment ordered in the letter of intent.

III Discussion:

1. Performance of Equipment

This division has gained some experience in the use of the 1401 system and has visited installations using various combinations of RCA and IBM equipment, including those using an RCA 301 and IBM 1401. We have determined that a certain percentage of error and/or down-time will be realized in any computer system, and that there is no valid reason to expect a marked difference between the IBM 1401 and the RCA 301.

2. Programming Costs and Man-Hours

The programming necessary to convert our peripheral equipment to an IBM 1401 computer is 70 per cent completed. We have found this task to be significantly greater than we were led to believe by the manufacturer. In addition, many RCA 501 programs had to be changed to fit the new computer's requirements. In the future, any new programs for the RCA 501 or any extensive system changes involving the

501 will require writing or changing 1401 programs to simulate peripheral equipment. For any special reports or "crash" report requests, a 1401 program would have to be written, compiled, tested, and possibly re-compiled one or more times, and re-tested before it were produced. We feel this to be inconvenient and inefficient. Conversely, we found that little or no programming is necessary when the RCA 301 is used to print reports prepared on the RCA 501. We tested actual data on an RCA 301, ~~using RCA 301~~, using RCA software, and printed reports without prior programming. One of the reports printed, without programming, had required a 1401 program that took 2 months elapsed time to write and de-bug. Future programming for a satellite computer would be virtually eliminated by the use of a 301, due to newly developed software and greater machine capacity and flexibility.

3. Equipment Potential

The RCA 301 system has two and one-half times more high speed storage, the printing speed is 1,000 lines per minute versus 600 lines per minute, and 64 characters are printable versus 47. If small data processing jobs are to be done on the satellite computer, the increased storage capacity of the 301 has much greater potential. Both computers have random access facilities, if this should become necessary, and both use standard form paper.

4. Equipment Costs

Because of changing requirements and better insight into computer capabilities and potential we have revised our original computer requirements. The RCA 301 system is $1,477.00 less monthly than the IBM 1401 system on order. It should also be noted that the IBM 1401 contract is for 176 hours a month, and the RCA 301 contract is for 200 hours a month, which, if our present utilization of peripheral equipment holds, would increase the cost of the IBM 1401 approximately $300.00 per month, due to extra use charges. Because of the higher speed of the 301 printer, we would avoid extra use charges on the 301, as well as having time to program small jobs not feasible for the 501. After reviewing our requirements

for a bill feed device, we do not believe it to be practical to order the high-speed bill feed printer, model 1404. We presently use about 20 hours a month on an EAM model 408 bill feed, which costs $300.00 per month more than a standard 407 model printer. The model 1404 printer costs $775.00 more than a 1403 printer and would only be used 5 hours a month. Thus, by retaining a 408 printer for bill feeding, our bill feeding cost would be reduced from $155.00 per hour for a 1404 to $15.00 per hour over normal printing cost.

IV Conclusions:

1. Either the RCA 301 or the IBM 1401 will provide a solution to our peripheral equipment problem.

2. The RCA 301 is more economical to lease than the IBM 1401.

3. The RCA 301 is better suited to the data processing needs of this division.

V Recommendations: It is recommended that:

1. The letter of intent to IBM Corporation for the installation of a 1401 system be cancelled.

2. A letter of intent be issued to RCA to install a 301 system, as outlined in Tab A, by 15 November 1962.

[redacted]

STATINTL

Tab A

PROPOSED RCA 301 SYSTEM

MODEL	DESCRIPTION	QTY	MONTHLY RENTAL
303	Basic Processor 10,000 char. MSM	1	$1,803.00
323	Card Reader	1	361.00
314-1	Card Reader Control	1	134.00
334	Card Punch	1	206.00
315	Card Punch Control	1	283.00
333	On-Line Printer	1	721.00
316-1	On-Line Printer Control	1	155.00
393-1	Tape Adapter	1	330.00
			$3,993.00